

WHAT IS CLAIMED IS:

1. A method for creating an object model describing the geometry of an object for use in machine vision inspection, said method comprising:

acquiring a pixel image representation of an object;

5 generating a set of part models of said object based on said pixel image representation, said part models corresponding to different respective parts of said object, said object model comprising said set of part models;

obtaining a test image containing the visual appearance of said object and a given known inspection measurement associated with the test image;

10 performing test inspection on said test image using said object model to produce a testing inspection measurement; and

retaining said object model when said given testing inspection measurement deviates from said given known inspection measurement by an amount lower than a predetermined threshold.

15 2. The method of claim 1, further comprising:

calibrating an image acquisition system to enable said acquiring to obtain calibrated said pixel image representation of said object; and

specifying one or more constraints for said object prior to said generating to provide additional information constraining said generating.

20 3. The method of claim 2, wherein said constraints include the geometric shape of said object.

4. The method of claim 2, wherein said constraints include the spatial relationship among different parts of said object.

5. The method of claim 1, said generating further comprising:

25 determining the dimension of said part of said object; and

determining the position of said part of said object.

6. The method of claim 1, wherein said object model includes geometric descriptions expressed with respect to a coordinate system.

7. The method of claim 1, said generating further comprising:

5 determining a coordinate system with respect to a specified reference; and  
generating said object model with respect to said coordinate system.

8. The method of claim 1, further comprising:

refining one or more of said part models;

configuring a machine vision inspection tool based on said object model;

10 evaluating the performance of said object model by evaluating testing  
inspection measurements in relation to known inspection measurements to produce an  
indication that said object model is one of satisfactory and unsatisfactory;

determining when said evaluating produces an indication of unsatisfactory,  
one or more causes that caused the unsatisfactory indication; and

15 deciding an act to which to return for an iteration based on said cause, said act  
including said generating, said creating, said refining, and said configuring.

9. A system for creating an object model describing the geometry of an object for  
use in machine vision inspection, said system comprising:

20 an image acquisition system to acquire a pixel image representation of an  
object;

a generator to generate part models of said object based on said pixel image  
representation, said part models corresponding to different respective parts of said object, a  
said object model comprising said part models;

25 an image storage mechanism to store a test image and a given known  
inspection measurement associated with said test image;

a testing unit to perform machine vision inspection on said test image using said object model to produce a testing inspection measurement; and

an object model storage mechanism to retain said object model when said testing inspection measurement deviates from said given known inspection measurement by an amount lower than a predetermined threshold.

10. The system of claim 9, further comprising:

a calibration unit to calibrate an image acquisition system to enable said calibration unit to obtain calibrated said pixel image representation of said object; and

a constraint set up unit to specify one or more constraints for said object to provide additional information constraining said generator.

11. The system of claim 10, wherein said constraints include the geometric shape of said object.

12. The system of claim 10, wherein said constraints include the spatial relationship among different parts of said object.

13. The system of claim 9, said generator further comprising:

a first determiner to determine the dimension of said part of said object; and

a second determiner to determine the position of said part of said object.

14. The system of claim 9, wherein said object model includes geometric descriptions expressed with respect to a coordinate system.

15. The system of claim 9, said generator further comprising:

a determiner to determine a coordinate system with respect to a specified reference; and

a generator to generate said object model with respect to said coordinate system.

16. The system of claim 9, further comprising:  
a refiner to refine one or more of said part models;  
a configuration unit that configures a machine vision inspection tool based on  
said object model; and

5 an evaluation unit to evaluate the performance of said object model by  
evaluating testing inspection measurement in relation to known inspection measurement to  
produce an indication that said object model is one of satisfactory and unsatisfactory;

a determiner to determine when said evaluation unit yields an indication of  
unsatisfactory, one or more causes that caused the unsatisfactory indication; and

10 a decider to decide an act to which to return for an iteration based on said  
cause, said act including steps performed by said generator, by said creator, by said refiner,  
and by said configuration unit.

17. A medium having information recorded thereon, such that when said information  
is read and executed by a computer, the computer is caused to:

15 acquire a pixel image representation of an object;  
generate part models of an object based on said pixel image representation,  
said part models corresponding to different respective parts of said object, said object model  
comprising said part models;

20 obtain a test image, containing the visual appearance of said object, and a  
given known inspection measurement associated with said test image;

perform test inspection on said test image using said object model to produce a  
testing inspection measurement; and

retain said object model when said test inspection measurement deviates from  
said given known inspection measurement by an amount lower than a predetermined

25 threshold.

18. The medium of claim 17, said information recorded on said medium further causes said computer to:

calibrate an image acquisition system to enable said acquiring to obtain calibrated said pixel image representation of said object; and

5 specify one or more constraints for said object prior to said generating to provide additional information constraining said generating.

19. The medium of claim 18, wherein said constraints include the geometric shape of said object.

10 20. The medium of claim 18, wherein said constraints include the spatial relationship among different parts of said object.

21. The medium of claim 17, wherein said information recorded on said medium further causes said computer to:

determine the dimension of said part of said object; and

determine the position of said part of said object.

15 22. The medium of claim 17, wherein said object model includes geometric descriptions expressed with respect to a coordinate system.

23. The medium of claim 17, wherein said information recorded on said medium further causes said computer to:

determine a coordinate system with respect to a specified reference; and

20 generate said object model with respect to said coordinate system.

24. The medium of claim 17, said information recorded on said medium further causes said computer to:

refine one or more of said part models;

configure a machine vision inspection tool based on said object model;

evaluate the performance of said object model by evaluating testing inspection measurement in relation to known inspection measurement to produce an indication that said object model is one of satisfactory and unsatisfactory;

5 determine when said evaluating produces an indication of unsatisfactory, one or more causes that caused the unsatisfactory indication; and

decide an act to which to return for an iteration based on said cause, said act including said generating, said creating, said refining, and said configuring.

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